Agency for Healthcare Research and Quality
Advancing Excellence in Health Care

NATIONAL GUIDELINE CLEARINGHOUSE

General

Guideline Title

Evidence-based clinical practice guideline: autologous breast reconstruction with DIEP or pedicled TRAM abdominal flaps.

Bibliographic Source(s)

Lee BT, Agarwal JP, Ascherman JA, Caterson SA, Gray DD, Hollenbeck ST, Khan SA, Loeding LD, Mahabir RC, Miller AS, Perdikis G, Schwartz JS, Sieling BA, Thoma A, Wolfman JA, Wright JL. Evidence-based clinical practice guideline: autologous breast reconstruction with DIEP or pedicled TRAM abdominal flaps. Plast Reconstr Surg. 2017 Nov;140(5):651e-664e. [25 references] PubMed

Guideline Status

This is the current release of the guideline.

This guideline meets NGC's 2013 (revised) inclusion criteria.

NEATS Assessment

National Guideline Clearinghouse (NGC) has assessed this guideline's adherence to standards of trustworthiness, derived from the Institute of Medicine's report Clinical Practice Guidelines We Can Trust.

= Poor = Fair = Good = Very Good = Excellent

Assessment	Standard of Trustworthiness
YES	Disclosure of Guideline Funding Source
	Disclosure and Management of Financial Conflict of Interests
	Guideline Development Group Composition
YES	Multidisciplinary Group

YES	Methodologist Involvement
▮▮▮▮▮	Patient and Public Perspectives
	Use of a Systematic Review of Evidence
▮▮▮▮▮	Search Strategy
▮▮▮▮▮	Study Selection
▮▮▮▮▮	Synthesis of Evidence
	Evidence Foundations for and Rating Strength of Recommendations
▮▮▮▮▯	Grading the Quality or Strength of Evidence
▮▮▮▮▮	Benefits and Harms of Recommendations
▮▮▮▮▮	Evidence Summary Supporting Recommendations
▮▮▮▮▯	Rating the Strength of Recommendations
▮▮▮▮▮	Specific and Unambiguous Articulation of Recommendations
▮▮▮▮▮	External Review
▮▮▮▯▯	Updating

Recommendations

Major Recommendations

Definitions for the levels of evidence (I–V) and the grades of the recommendations (A–D) are provided at the end of the "Major Recommendations" field.

Recommendations Related to Clinical Complications

The Work Group suggests that clinicians may treat patients undergoing mastectomy and autologous breast reconstruction with either surgical technique (pedicled transverse rectus abdominis musculocutaneous [TRAM] flap or deep inferior epigastric perforator [DIEP] flap, contingent on the use of mesh for pedicled TRAM procedures) because the risk of donor-site complications is comparable among procedures. Patient preference should have a substantial influencing role. (Level III, IV Evidence; Recommendation Grade: C)

The Work Group suggests that clinicians may treat patients undergoing mastectomy and autologous breast reconstruction with either surgical technique (pedicled TRAM flap or DIEP flap) because the risk of flap-related complications is comparable among procedures. Patient preference should have a substantial influencing role. (Level III, IV Evidence; Recommendation Grade: C)

Based on little or no systematic empirical evidence, it is the consensus of the Work Group that clinicians may treat patients undergoing mastectomy and autologous breast reconstruction with either surgical technique (pedicled TRAM flap or DIEP flap) because the risk of systemic complications (deep vein thrombosis and pulmonary embolism) is indeterminate among procedures.

(Level IV Evidence; Recommendation Grade: D)
Based on little or no systematic empirical evidence, it is the consensus of the Work Group that clinicians may treat patients undergoing mastectomy and autologous breast reconstruction with either surgical technique (pedicled TRAM flap or DIEP flap) because the risk of revision/reoperation and reconstruction failure is indeterminate among procedures. (Level IV Evidence; Recommendation Grade: D)

Recommendations for Patient Satisfaction

Based on little or no systematic empirical evidence, it is the consensus of the Work Group that clinicians may treat patients undergoing mastectomy and autologous breast reconstruction with either surgical technique (pedicled TRAM flap or DIEP flap) because there were no differences in patient satisfaction noted. However, it was found that the level of patient satisfaction is high among both procedures. (Level IV Evidence; Recommendation Grade: D)

Definitions

American Society of Plastic Surgeons (ASPS) Evidence Rating Scales

Evidence Rating Scale for Therapeutic Studies

Level of Evidence	Qualifying Studies
I	High-quality, multi-centered or single-centered, randomized controlled trial with adequate power; or systematic review of these studies
II	Lesser-quality, randomized controlled trial; prospective cohort or comparative study; or systematic review of these studies
III	Retrospective cohort or comparative study; case-control study; or systematic review of these studies
IV	Case series with pre/posttest; or only posttest
V	Expert opinion developed via consensus process; case report or clinical example; or evidence based on physiology, bench research, or "first principles"

Evidence Rating Scale for Diagnostic Studies

Level of Evidence	Qualifying Studies
I	High-quality, multi-centered or single-centered, cohort study validating a diagnostic test (with "gold" standard as reference) in a series of consecutive patients; or a systematic review of these studies
II	Exploratory cohort study developing diagnostic criteria (with gold standard as reference) in a series of consecutive patients; or a systematic review of these studies
III	Diagnostic study in nonconsecutive patients (without consistently applied gold standard as reference); or a systematic review of these studies
IV	Case-control study; or any of the above diagnostic studies in the absence of a universally accepted gold standard
V	Expert opinion developed via consensus process; case report or clinical example; or evidence based on physiology, bench research, or "first principles"

Evidence Rating Scale for Prognostic/Risk Studies

Level of Evidence	Qualifying Studies
I	High-quality, multi-centered or single-centered, prospective cohort or comparative study with adequate power; or a systematic review of these studies

Level of Evidence	Qualifying Studies
II	Lesser-quality prospective cohort or comparative study; retrospective cohort or comparative study; untreated controls from a randomized controlled trial; or a systematic review of these studies
III	Case-control study; or systematic review of these studies
IV	Case series with pre/posttest; or only posttest
V	Expert opinion developed via consensus process; case report or clinical example; or evidence based on physiology, bench research, or "first principles"

Scale for Grading Recommendations

Grade	Description	Qualifying Evidence	Implications for Practice
A	Strong Recommendation	Level I evidence or consistent findings from multiple studies of Levels II, III, or IV	Clinicians should follow a strong recommendation unless a clear and compelling rationale for an alternative approach is present.
B	Recommendation	Levels II, III, or IV evidence and findings are generally consistent	Generally, clinicians should follow a recommendation but should remain alert to new information and sensitive to patient preferences.
C	Option	Levels II, III, or IV evidence, but findings are inconsistent	Clinicians should be flexible in their decision-making regarding appropriate practice, although they may set bounds on alternatives; patient preference should have a substantial influencing role.
D	Option	Level V: Little or no systematic empirical evidence	Clinicians should consider all options in their decision-making and be alert to new published evidence that clarifies the balance of benefit versus harm; patient preference should have a substantial influencing role.

Clinical Algorithm(s)

None provided

Scope

Disease/Condition(s)

Breast cancer

Guideline Category

Assessment of Therapeutic Effectiveness

Evaluation

Management

Treatment

Clinical Specialty

Oncology

Plastic Surgery

Intended Users

Physicians

Guideline Objective(s)

To expand on the breast reconstruction treatment options available by providing evidence-based recommendations for the two most commonly performed autologous breast reconstruction procedures based on the Tracking Operations and Outcomes for Plastic Surgeons program

Target Population

Patients undergoing breast reconstruction with autologous abdominal flap

Interventions and Practices Considered

Autologous breast reconstruction

Pedicled transverse rectus abdominis musculocutaneous (TRAM) flap
Deep inferior epigastric perforator (DIEP) flap

Major Outcomes Considered

- Complications
  - Donor-site
  - Flap-related
  - Systemic
  - Procedure-related
- Patient satisfaction

Methodology

Methods Used to Collect/Select the Evidence

Searches of Electronic Databases

Description of Methods Used to Collect/Select the Evidence

Literature Search

The literature search was performed between 2012 and 2014 and aimed to identify relevant studies published during the previous 10-year period (January of 2003 to June of 2014). Electronic searches of PubMed, Cochrane Library, and Cumulative Index to Nursing and Allied Health Literature databases were performed. The journal *Plastic and Reconstructive Surgery Global Open* was searched separately, as publications from *Plastic and Reconstructive Surgery Global Open* were not indexed in the selected databases at the time of this review. Literature searches were performed by using appropriate combinations of the following MEDLINE Medical Subject Headings (MeSH) terms and keywords, as permitted by the search functionalities of each database/journal:

MeSH terms (used in PubMed only): "Abdomen"[MeSH], "Abdominal Wall" [MeSH], "Free Tissue Flaps" [MeSH], "Hematoma"[MeSH], "Hernia"[MeSH], "Infection" [Mesh], "Mammaplasty"[MeSH], "Necrosis" [MeSH], "Patient Outcome Assessment"[MeSH], "Patient Satisfaction"[MeSH], "Postoperative Complications"[MeSH], "Pulmonary embolism"[MeSH], "Reoperation"[MeSH], "Risk"[MeSH], "Second-look Surgery"[MeSH], "Seroma"[MeSH], "Surgical Flaps"[MeSH], "Surgical Mesh"[MeSH], "Surgical Wound Dehiscence"[MeSH], "Treatment Outcome"[MeSH], and "Venous Thrombosis"[MeSH].
Keywords: Abdominal flap, abdominal free flap, abdominal pedicled flap, abdominal weakness, autologous breast reconstruction, bulge, complications, deep vein thrombosis, flap failure, outcomes, and patient satisfaction.

Initial study selection for each clinical question was performed by one reviewer with a two-level screening process. Level I screening involved a review of the title and abstracts of the articles captured by the search strategies, to identify potentially relevant studies for inclusion in level II screening. Level II screening involved a review of the full-text of articles to confirm relevance and compare study details with the inclusion and exclusion criteria below.

Inclusion Criteria

Published within the past 10 years (January 1, 2003, to June 14, 2014)
Published in English language
Reported a meta-analysis/systematic review; randomized controlled trial; prospective or retrospective cohort/comparative, case-control, or case series
Reported outcomes of interest for clinical questions (complications and/or patient satisfaction)
Included at least 30 patients

Exclusion Criteria

Published outside of inclusion date range
Published in language other than English
Reported a case report, economic analysis, animal study, cadaver study, narrative review, or editorial
Reported no outcomes of interest
Included fewer than 30 patients

The bibliographies of articles meeting inclusion criteria were manually searched to identify relevant articles missed during the electronic searches. These articles were screened as described above. Duplicate articles were eliminated. Studies meeting inclusion criteria were assessed for methodologic quality, as described below. Excluded studies and their reasons for exclusion were documented for review by the Work Group to confirm the final rejection or reconsider the study for inclusion. Additional references were included in this review if considered necessary for background or discussion; however, these references were not critically appraised or used in the development of recommendation statements.

Number of Source Documents

A total of 564 studies for clinical question 1 and 267 studies for clinical question 2 were retrieved through the literature search. After screening and critical appraisal were performed, 20 studies were selected for final review for this guideline (see Figures 1 and 2 in the original guideline document). Each study reported at least one outcome of interest (complications and/or patient satisfaction); 18 studies reporting clinical complications data and eight studies reporting patient satisfaction data were used to develop practice recommendations.

Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

Rating Scheme for the Strength of the Evidence

American Society of Plastic Surgeons (ASPS) Evidence Rating Scales

Evidence Rating Scale for Therapeutic Studies

Level of Evidence	Qualifying Studies
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III	Diagnostic study in nonconsecutive patients (without consistently applied gold standard as reference); or a systematic review of these studies
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Level of Evidence	Qualifying Studies
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II	Lesser-quality prospective cohort or comparative study; retrospective cohort or comparative study; untreated controls from a randomized controlled trial; or a systematic review of these studies
III	Case-control study; or systematic review of these studies
IV	Case series with pre/posttest; or only posttest
V	Expert opinion developed via consensus process; case report or clinical example; or evidence based on physiology, bench research, or "first principles"

Methods Used to Analyze the Evidence

Systematic Review with Evidence Tables

Description of the Methods Used to Analyze the Evidence

Critical Appraisal of Evidence

The American Society of Plastic Surgeons evidence-based process includes a rigorous critical appraisal process to evaluate the methodologic quality of clinical studies and the strength of clinical evidence for the purposes of developing clinical practice guidelines and performance measures. The process is also used to rate individual studies published in *Plastic and Reconstructive Surgery*. Studies were appraised for methodologic quality with the American Society of Plastic Surgeons Critical Appraisal Checklists and assigned levels of evidence according to the American Society of Plastic Surgeons Evidence Rating Scales, which are designed for the evaluation of therapeutic, prognostic/risk, and diagnostic studies (see the "Rating Scheme for the Strength of the Evidence" field). The checklists and scales were developed in 2009 by an expert Task Force and are based on the principles of the Critical Appraisal Skills Programme and the Centre for Evidence Based Medicine. Each study was appraised by at least two reviewers. If a discrepancy existed between the reviewers, the study was appraised by a third reviewer, and the level of evidence was determined by consensus. Evidence ratings were not assigned to studies with inadequately described methods and/or worrisome biases. As such, these studies were excluded from further review.

Data Extraction and Outcomes Definitions

Quantitative and qualitative data relevant to the clinical questions were extracted from the studies that met inclusion criteria and qualified for a level-of-evidence rating. Data were compiled in Excel (Microsoft Corp., Redmond, Wash.) spreadsheets.

Quantitative data on complication outcomes were pooled across the studies to calculate the probability of the complication occurring for each flap type. The following complications were evaluated, if reported in the studies:

Donor-site complications: hernia, bulge, infection, necrosis, seroma, hematoma, and wound dehiscence
Flap-related complications: flap loss, necrosis, infection, seroma, hematoma, and wound dehiscence
Systemic complications: venous thromboembolism, including deep vein thrombosis and/or pulmonary embolism
Procedure-related complications: revision/reoperation and reconstruction failure rate

Patient satisfaction was evaluated differently among the included studies. Because of the number and variety of scales used for assessing patient satisfaction, the reported scales were grouped into three categories: Michigan Breast Satisfaction Questionnaires, 10-point Likert scales, and other (e.g., Short-Form 36-Item Health Survey, Qualitative Assessment of Back Pain). The 10-point Likert scales were assessed similarly to the Michigan Breast Satisfaction Questionnaire by separating the level of satisfaction into binary groups (1 through 7 = not satisfied; 8 through 10 = satisfied).

Methods Used to Formulate the Recommendations

Expert Consensus

Description of Methods Used to Formulate the Recommendations

Work Group Selection Process

American Society of Plastic Surgeons members were invited to apply to the Work Group by means of Society e-mail and fax communication. All applicants were required to submit an online conflict-of-interest disclosure form for membership consideration. Members of the American Society of Plastic Surgeons Quality and Performance Measurement Committee reviewed and selected Work Group members to ensure a diverse representation of U.S. regions; practice type (large multispecialty group practice, small group practice, solo practice, and academic practice); and clinical, research, and evidence-based medicine

experiences and expertise. Four stakeholder organizations—the American Society of Breast Surgeons, the American College of Radiology, the American Society of Clinical Oncology, and the American Society for Radiation Oncology—were also invited to participate in the guideline development process by nominating one member from their respective organizations to serve on the Work Group. A patient representative was included on the panel to provide insight related to patient values and preferences, and an American Society of Plastic Surgeons quality department staff member was assigned to manage the project and provide expertise in clinical practice guideline development methodology.

Clinical Question Development

Work Group members used a consensus-based approach to select the clinical questions to be addressed in this evidence-based guideline. Work Group members used a blinded process to submit clinical questions by means of individual e-mail to the American Society of Plastic Surgeons project manager, who compiled and dispersed the clinical questions for consideration and discussion at the introductory meeting. The clinical questions were selected with a five-phase process that consisted of brainstorming, discussion, ranking/prioritizing, refining, and voting.

A total of 36 clinical questions were reviewed by the Work Group and ranked according to the following criteria to assess for potential impact: (1) relevance to guideline scope; (2) addresses a gap in care; (3) ability to develop into an actionable recommendation; (4) ability to develop into an implementable recommendation; (5) is controversial or of significant interest; and (6) is important to public health. The Work Group initially agreed on 11 clinical questions; however, the large scope of the overall topic of autologous breast reconstruction would not allow for a timely guideline. In 2016, the guideline was narrowed and the original 11 clinical questions were refined into the following two clinical questions:

> In patients undergoing mastectomy and autologous breast reconstruction, which surgical technique, pedicled transverse rectus abdominis musculocutaneous (TRAM) flap versus deep inferior epigastric perforator (DIEP) flap, is associated with the lower incidence of clinical complications?
> In patients undergoing mastectomy and autologous breast reconstruction, which surgical technique, pedicled TRAM flap versus DIEP flap, is associated with the highest level of patient satisfaction?

Thus, the methodology and results described herein relate to the review of data and the development of recommendations for these clinical questions only. The remaining clinical questions may be considered for future guidelines.

Grading of Recommendations

Clinical practice recommendations were developed through a consensus process with consideration to the following three factors: (1) level of evidence (study quality); (2) assessment of benefits versus harms; and (3) patient preferences. Work Group members jointly drafted statements for each recommendation during conference call meetings and online discussions. After each meeting, members had an opportunity to individually comment and revise the draft recommendations by means of e-mail discussion. Work Group members participated in several rounds of revisions until unanimous consensus was achieved for each recommendation statement. Each recommendation in this guideline is accompanied by a grade indicating the strength of the recommendation, which was determined by considering the overall level of evidence supporting the recommendation and the judgment of the guideline developers.

Rating Scheme for the Strength of the Recommendations

Scale for Grading Recommendations

Grade	Description	Qualifying Evidence	Implications for Practice
A	Strong Recommendation	Level I evidence or consistent findings from multiple studies of Levels	Clinicians should follow a strong recommendation unless a clear and compelling rationale for an alternative approach is present.

Grade	Description	Qualifying Evidence	Implications for Practice
B	Recommendation	Levels II, III, or IV evidence and findings are generally consistent	Generally, clinicians should follow a recommendation but should remain alert to new information and sensitive to patient preferences.
C	Option	Levels II, III, or IV evidence, but findings are inconsistent	Clinicians should be flexible in their decision-making regarding appropriate practice, although they may set bounds on alternatives; patient preference should have a substantial influencing role.
D	Option	Level V: Little or no systematic empirical evidence	Clinicians should consider all options in their decision-making and be alert to new published evidence that clarifies the balance of benefit versus harm; patient preference should have a substantial influencing role.

Cost Analysis

A formal cost analysis was not performed and published cost analyses were not reviewed.

Method of Guideline Validation

External Peer Review

Internal Peer Review

Description of Method of Guideline Validation

Peer Review and Public Comment Process

The draft guideline was peer reviewed by the American Society of Breast Surgeons, the American College of Radiology, the American Society of Clinical Oncology, and the American Society for Radiation Oncology. American Society of Plastic Surgeons members of the Quality and Performance Measurement and Healthcare Delivery Committees were also invited to participate in the peer review process. Peer reviewers were invited to review and provide feedback on the validity, generalizability, and clarity of the draft guideline using the Appraisal of Guidelines for Research & Evaluation II instrument. After peer review, the draft guideline was posted on the American Society of Plastic Surgeons Web site for a 2-week public comment period.

Guideline Approval Process

After the peer review and public comment processes, the guideline draft was reviewed and modified by the Work Group in consideration of peer review and public comments. The final guideline was approved by the American Society of Plastic Surgeons Executive Committee during its meeting in December of 2016.

Evidence Supporting the Recommendations

Type of Evidence Supporting the Recommendations

The type of supporting evidence is identified and graded for each recommendation (see the "Major Recommendations" field).

Benefits/Harms of Implementing the Guideline

Recommendations

Potential Benefits

- Potential benefits of each procedure include shorter operative times with pedicled transverse rectus abdominis musculocutaneous (TRAM) flaps and preservation of the rectus muscle with deep inferior epigastric perforator (DIEP) flaps.
- In general, it can be concluded that both pedicled TRAM and DIEP flaps are associated with a high level of patient satisfaction.

Potential Harms

- Potential harms include increasing operative risks inherent in longer operative times of deep inferior epigastric perforator (DIEP) flap procedures and a theoretical decrease in abdominal strength with pedicled transverse rectus abdominis musculocutaneous (TRAM) flaps, although this has not been shown to affect daily activities and was not documented in the examined articles.
- Donor-site morbidity includes hernia, bulge, infection, necrosis, seroma, hematoma, or wound dehiscence.
- Flap-related complications include flap loss, necrosis, infection, seroma, hematoma, and wound dehiscence.
- Systemic complications include deep vein thrombosis and pulmonary embolism.
- Procedure-related complications include revision/reoperation and reconstruction failure.

Qualifying Statements

Qualifying Statements

- Evidence-based guidelines are strategies for patient management, developed to assist physicians in clinical decision-making. This guideline was developed through a comprehensive review of the scientific literature and consideration of relevant clinical experience, and describes a range of generally acceptable approaches to diagnosis, management, or prevention of specific diseases or conditions. This guideline attempts to define principles of practice that should generally meet the needs of most patients in most circumstances.
- This guideline should not be construed as a rule, nor should it be deemed inclusive of all proper methods of care or exclusive of other methods of care reasonably directed at obtaining the appropriate results. It is anticipated that it will be necessary to approach some patients' needs in different ways. The ultimate judgment regarding the care of a particular patient must be made by the physician in light of all the circumstances presented by the patient, the available diagnostic and treatment options, and available resources.
- This guideline is not intended to define or serve as the standard of medical care. Standards of medical care are determined on the basis of all the facts or circumstances involved in an individual case and are subject to change as scientific knowledge and technology advance and as practice patterns evolve. This guideline reflects the state of current knowledge at the time of publication. Given the inevitable changes in the state of scientific information and technology, this guideline will be considered relevant for a period of 5 years after publication; publication, in accordance with the inclusion criteria of the National Guideline Clearinghouse.

Implementation of the Guideline

Description of Implementation Strategy

An implementation strategy was not provided.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Getting Better

Living with Illness

Staying Healthy

IOM Domain

Effectiveness

Patient-centeredness

Identifying Information and Availability

Bibliographic Source(s)

Lee BT, Agarwal JP, Ascherman JA, Caterson SA, Gray DD, Hollenbeck ST, Khan SA, Loeding LD, Mahabir RC, Miller AS, Perdikis G, Schwartz JS, Sieling BA, Thoma A, Wolfman JA, Wright JL. Evidence-based clinical practice guideline: autologous breast reconstruction with DIEP or pedicled TRAM abdominal flaps. Plast Reconstr Surg. 2017 Nov;140(5):651e-664e. [25 references] PubMed

Adaptation

Not applicable: The guideline was not adapted from another source.

Date Released

2017 Nov

Guideline Developer(s)

American Society of Plastic Surgeons - Medical Specialty Society

Source(s) of Funding

This clinical practice guideline was funded exclusively by the American Society of Plastic Surgeons; no outside commercial funding was received to support the development of this article.

Guideline Committee

Guideline Work Group

Composition of Group That Authored the Guideline

Work Group Members: Bernard T. Lee, M.D., M.B.A., M.P.H. (*Work Group Chair*); Jayant P. Agarwal, M.D.; Jeffrey A. Ascherman, M.D.; Stephanie A. Caterson, M.D.; Diedra D. Gray, M.P.H.; Scott T. Hollenbeck, M.D.; Seema A. Khan, M.D.; Lauren D. Loeding, M.P.H.; Raman C. Mahabir, M.D.; Archibald S. Miller, M.D., M.S.; Galen Perdikis, M.D.; Jaime S. Schwartz, M.D.; Beth A. Sieling, M.D.; Achilles Thoma, M.D., M.Sc.; Judith A. Wolfman, M.D.; Jean L. Wright, M.D.

Financial Disclosures/Conflicts of Interest

All contributors and preparers of the guideline, including American Society of Plastic Surgeons (ASPS) staff and consultants, disclosed all relevant conflicts of interest via an online disclosure reporting database. In accordance with the Institute of Medicine's recommendations for guideline development, members with a conflict of interest represented less than half of the guideline Work Group.

Bernard T. Lee, M.D., M.B.A., M.P.H., Work Group Chair, has no relevant disclosures; Jayant P. Agarwal, M.D., has received research support from Mentor Corporation, Life-Cell Corporation, DePuy Synthes, and NIH, as the PI in grants funded by DSM Biomedical, and served as a consultant for DonJoy Orthopedics; Jeffrey A. Ascherman, M.D., Stephanie A. Caterson, M.D., Diedra D. Gray, M.P.H., Scott T. Hollenbeck, M.D., Seema A. Khan, M.D., Lauren D. Loeding, M.P.H., Raman C. Mahabir, M.D., and Archibald S. Miller, M.D., have no relevant disclosures; Galen Perdikis, M.D., has served as a teacher for IHE; Jaime S. Schwartz, M.D., has received research support from Covidien, Ltd, and served on the Advisory Board of Mentor Corporation, receiving honorarium; Beth A. Sieling, M.D., has served as a consultant for Myriad and Genomic Health; Achilles Thoma, M.D., has no relevant disclosures; Judith A. Wolfman, M.D., has served on the Advisory Board of Hologic; Jean L. Wright, M.D., has no relevant disclosures.

Guideline Endorser(s)

American College of Radiology - Medical Specialty Society

American Society for Radiation Oncology - Professional Association

Guideline Status

This is the current release of the guideline.

This guideline meets NGC's 2013 (revised) inclusion criteria.

Guideline Availability

Available from the American Society of Plastic Surgeons Web site .

Availability of Companion Documents

None available

Patient Resources

None available

NGC Status

This NGC summary was completed by ECRI Institute on March 20, 2018. The information was verified by the guideline developer on March 20, 2018.

This NEATS assessment was completed by ECRI Institute on March 15, 2018. The information was verified by the guideline developer on March 20, 2018.

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